### PATENT ABSTRACTS OF JAPAN

(11)Publication number:

2008-150627

(43)Date of publication of application: 03.07.2008

(51)Int.Cl.

COSL 101/10 (2006, 01) 71/02 (2006, 01) (2006, 01) 5/098 5/17 (2006, 01) 23/26 (2006, 01)

(21)Application number: 2008-068520

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(22)Date of filing: 17.03.2008

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Priority number: 2001226971 2001295770

Priority date: 27.07.2001

27.09.2001 06.11.2001 Priority country : JP JP. JP

2001340999

(54) CURABLE COMPOSITION (57)Abstract:

PROBLEM TO BE SOLVED: To provide a curable composition giving a cured product which ensures practical curability and recovery properties and exhibits mechanical properties of high strength and high elongation.

SOLUTION: The curable composition is characterized by comprising (A) an organic polymer having at least one silicon-containing group which has a hydroxy or hydrolyzable group bonded to the silicon atom and is crosslinkable by forming a siloxane bond, and (B) one or more metal salts of a carboxylic acid selected from calcium carboxylate, vanadium carboxylate, iron carboxylate, titanium carboxylate, potassium carboxylate, barium carboxylate, manganese carboxylate, nickel carboxylate, cobalt carboxylate, and zirconium carboxylate.

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3.In the drawings, any words are not translated.

Claim 1]

CLAIMS

combined with a silicon atom, and has at least one silicon content group which can construct a bridge by forming a siloxane bond ] an organio polymer, (B) carboxylio acid cobalt or carboxylio acid iron, (B) Carboxylio acid metal salt of an ingradiant is carboxylio acid metal salt in which a carbon atom (A) Contain carboxylio acid metal salt of either [ which has a hydroxyl group or a hydrolytic basis

which adjoins a carbonyl group has an acid radical of carboxylic acid which is the third class carbon or quaternary carbon,

(A) A hardenability constituent containing the (B) ingredient of quantity which serves as 0.005 - 5 weight section by metallic element conversion contained in the (B) ingredient to ingredient 100 weight

(C) The hardenability constituent according to claim 1 which becomes considering an amine Claim 2

compound as an essential ingredient as an ingredient. Claim 3

A) A number average molecular weight is within the limits of 500-50,000, and an organic polymer of in ingredient is a general formula to an end and/or a side chain of a main chain (1).

H 20 | F30 Formula 1

hydroxyl group or a hydrolytic basis independently, respectively, a is 0, 1, 2 or 3 b is 0, 1, or 2, and a and b are not disimismicately extremely to b. In the thresping of b, or 1-19 — it is — the hardenability constituent given in Claims 1 and 2 having one or more hydrolytic skyl groups per molecule constituent given in Claims 1 and 2 having one or more hydrolytic skyl groups per molecule. the carbon numbers 6-20, an aralkyl group of the carbon numbers 7-20, or (R') 3SIO independently. respectively. - (R) respectively -- independent -- the substitution of the carbon numbers 1-20, or [R<sup>1</sup> and R<sup>2</sup> among a formula) They are an alkyl group of the carbon numbers 1-20, an aryl group of an unsubstituted hydrocarbon group — it is — it is the Tori ORGANO siloxy group shown. X is a

expressed Claim 4

The hardenability constituent according to claim 3, wherein X is an alkoxy group.

A) A hardenability constituent given in any 1 paragraph of Claims 1-4 whose organic polymers of an ngredient are a polyoxyalitylene series polymer and/or a saturated hydrocarbon system polymer. Claim 5

The hardenability constituent according to claim 5 which is a polymar wherein said saturated hydrocarbon system polymer has a repeating unit resulting from isobutylene 50% of the weight or

more in a total amount. [Claim 7]

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JP,2008-150627,A [CLAIMS]

(B) A hardenability constituent given in any 1 paragraph of Claims 1-6 to which carboxylic acid iron of an ingredient uses as the main ingradients carboxylic acid metal saft expressed with the general formula (4) or (5), and carboxylio acid cobalt of the (B) ingredient uses as the main ingredients oarboxylic acid metal salt axpressad with a general formula (11).

-a(OCOR) 2 (4) Fe(OCOR) 3 (5)

(The inside R of a formula is substitution or an unsubstituted hydrocarbon group which has the third Co(OCOR) 2 (11)

salt of an ingredient is the carboxylic acid metal salt in which the melting point has an acid radical of (B) The hardenability constituent according to any one of claims 1 to 7 whose carboxylic acid metal carboxylic acid which is 65 \*\* or less. Claim 8

class carbon or quaternary carbon which adjoins a carbonyl group, and include a carbon carbon

double bond.)

It may be.

matal salt which has an acid radical of carboxylic acid whosa carbon numbers in which carboxylic acid (B) The hardenability constituent according to any one of claims 1 to 7 which is the carboxylic acid metal salt of an ingredient contains carbon of a carbonyl group are 2-17. Claim 9]

carboxylic acid group contant compound in which carboxylic acid metal salt of an ingredient is choson B) A hardenability constituent given in any 1 paragraph of Claims 1-8 which are metal salt of a rom 2-ethylhexanoic acid, neo decanoic acid, or naphthenic acid Claim 10]

(A) A hardenability constituent given in any 1 paragraph of Claims 2-10 containing the (B) ingredient of quantity which serves as 0.005 - 5 weight section by metallic element conversion contained in the B) ingredient, the (C) ingredient 0.01 - 20 weight sections to ingredient 100 weight section.

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### ETAILED DESCRIPTION

Detailed Description of the Invention] Field of the Invention] n this invention, it has the hydroxyl group or hydrolytic basis combined with the silicon atom, and a

Therefore, it is related with the hardenability constituent containing the organic polymer which has a silloon content group (henceforth a "reactive silloon group") which can construct a bridge. sloxane bond is formed.

### Background of the Invention]

t is known that the organic polymer which contains at least one reactive silloon group in a molecule accompanied by the hydrolysis reaction of a reactive silicon group, etc., and a rubber-like hardened as the interesting character in which construct a bridge by formation of the siloxane bond naterial is obtained with hygroscopic surface moisture etc. also in a room temperature.

oolyisobutylene system polymer, it is indicated by JP,S52-73998.A. JP,H5-125272.A. JP,H3-72527.A. n the polymer which it has, these reactive silicon groups a polyoxyalkylene series polymer and a JP,S63-6003,A, JP,S63-6041,A, JP,H1-38407,A, JP,H8-231758,A, etc.

produced industrially, and are widely used for uses, such as a sealing material, adhesives, and a paint. Especially a polyoxyalkylene series polymer and a polyisobutylene system polymer are already

neat resistance, a water resisting property, weatherability, stc., if the hardened material obtained is lead for a structural assling material, the seeling material for multiple glass, etc., it is effective. The abbutylene system polymer which has a repeating unit which furthermore originates in isobutylans 50% of the weight or more in a total amount is preferred aa a saalant alming at moisture proof from sspecially the thing to excel in low moisture permeability and low gas permeability. When an organic polymer is a saturated hydrocarbon system polymer especially, since it excels in

watertight and airtightness becomes very important, and revealing sufficient elongation and intensity Such a sealing material generally fills up the joined part and crevice between various members, the flattery nature to the use part ranging from being used to a long period of time in order to give

s called for.

ethylhexanoic acid) tin. The tin series catalyst represented by stravalent tin, such as dibuthfun prescribtedomsts, in susa widely, and when the more offen per a catalysts are septemble sealing materials is large, since the hardened material which has stability is obtained, many divident tin purpose of a silanol condensation catalyst being used for bridge construction hardening of an organic polymer which, on the other hand, has such a reactive silicon group, and also accelerating a condensation reaction. As such a silanol condensation catalyst, divalent tin, such as octylic acid (2-Amine compounds, such as lauryl amine, are used together as a co-catalyst in many cases for the 19000

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# JP,2008-150627,A [DETAILED DESCRIPTION]

elongation of a hardened material which are acquired may be insufficient, and an improvement of the compound of a co-cetalyst and is used as a curing catalyst of the (A) ingredient, the intensity and However, when octylic acid tin which is divalent tin, for example is used togather with the amine further physical properties is deaired.

hardened material obtained has emollience, i.e., having the character to follow to the long-term stress Although most is a dibutyltin type, the latter tetravalent tin saries catalyat being used now, While tha change from the outside and fast curability, it is broadly used from the ability to apply as a curing tributyItin contains in this is regarded as questionable, development of the silanol condensation catalyst of 1 liquid mold-curing nature constituent. However, since toxicity in case a small catalyst of a non-tin series is desired.

In JP,S35-2795,B, JP,S32-3742,B, JP,S35-9639,B, JP,S37-3271,B, etc., As a curing catalyst of an organopolysiloxane constituent, the carboxylic acid metal salt of various kinds of non-tin is indicated with carboxylate of tin. As an example in which the carboxylic acid metal salt of non-tin was used for 12860,A) and carboxylic sold cerium (JP,2000-313814,A), there was no example broadly examined in the curing catalyst of the constituent which, on the other hand, contains the organic polymer which has a reactive silicon group, Although there were carboxylic acid bismuth (JP,H5-39428,A, JP,H9-

various carboxylio acid matal aalt until now. Patent documents 1] JP,S52-73998,A Patent documents 2] JP,H5-125272,A

Patent documents 7] JP,H8-231758,A Patant documents 3] JP,H3-72527,A Patent documents 5] JP.S63-6041.A Patent documents 4] JP,S63-6003,A Patent documents 6] JP,H1-38407.A

Patent documents 8] JP.S35-2795,B Patent documents 9] JP,S32-3742,B

Patent documents 11] JP,S37-3271,B etc. Patent documents 14] JP,2000-313814,A Patent documents 12] JP,H5-39428,A Patent documents 10] JP,S35-9639,B Patent documents 13] JP,H9-12860,A Description of the Invention]

Problam(s) to be Solved by the Invention] he purpose of this invention is as follows. 00100

Provide a hardenability constituant useful as the structural sealing material asked especially for high durability, the scaling material for multiple glass, the moisture seal material used for an electric electronic component, adhesives, etc. from revealing the outstanding intensity and elongation. Have practical hardenability and stability with a good hardened material obtained.

## [Means for Solving the Problem]

catalyst of the (A) ingredient Carboxylic acid calcium, Carboxylic acid vanadium, carboxylic acid iron, carboxylic soid cobalt, and a carboxylic acid zirconium, Securing moderate hardenability and stability it finds out revealing high intensity and the physical properties of high elongation compared with a carboxyllo acid titanium, carboxylic acid potassium, By using one or more sorts of carboxylic acid In order that this invention persons may solve such a problem, as a result of Inquiring, as a curing metal salt chosen from carboxylic acid barium, carboxylic acid manganese, carboxylic acid nickol, pase where octylic acid tin ia used as a curing catalyst, and came to complete this invention.

it is related with a hardanability constituent containing one or more sorta of carboxylic acid metal salt Namely, this invention has a hydroxyl group or a hydrolytic basis combined with the (A) silicon atom, chosen from an organic polymar, (B) carboxylic acid iron, and carboxylic acid cobalt which have at nttp://www4.ipdl.inpit.go.jp/ogi-bin/tran\_web\_ogi\_ejje?atw\_u=http%3A%2F%2Fwww4.ipdl.i.. 2010/05/06

JP.2008-150627,A [DETAILED DESCRIPTION]

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aast one silicon content group which can construct a bridga by forming a siloxane bond.

As a desirable embodiment, a number avarage molecular weight is within the limits of 500-50,000, and An amine compound is related with the aforementioned hardenability constituent which becomes as an assential ingredient as a (C) ingredient

an organic polymer of tha (A) ingredient is a general formula to an end and/or a side chain of a main thain (1):

Ξ Formula 1

R and R among a formula) They are an alkyl group of tha carbon numbers 1-20, an aryl group of the carbon numbers 6-20, an aralkyl group of the carbon numbers 7-20, or (R) 3SIO indapendantly, respectively. - (R) respectively -- independent -- the substitution of the carbon numbers 1-20, or

hydroxyl group or a hydrolytic basis independently, respectively. a is 0, 1, 2, or 3, b is 0, 1, or 2, and a pardenability constituent given in said either having one or more hydrolytic silyl groups per molecule and b are not simultaneously set to 0. m -- the integer of 0, or 1-19 -- it is -- it is related with a an unsubstituted hydrocarbon group -- it is -- it is the Tori ORGANO siloxy group shown. X is a

t is related with the aforementioned hardenability constituent characterized by X being an alkoxy roup as a desirable embodiment.

As a desirable embodiment, the organic polymer of the (A) ingredient is related with a hardenability constituent given in said either which is a polyoxyalkylene series polymer and/or a saturated As a desirable embodiment, said saturated hydrocarbon system polymer is related with the

nydrocarbon system polymer.

4a a dasirable embodiment, carboxylic acid iron of the (B) ingredient and carboxylic acid cobalt are aforamantioned hardenability constituent which is a polymer having a repeating unit resulting from sobutylene 50% of the weight or more in a total amount.

related with a hardenability constituent given in said either which uses as the main ingrodients carboxylic acid metal salt expressed with the general formula (4), (5), and (11), respectively. e(OCOR) 2 (4)

Co(OCOR) 2 (11) Fe(OCOR) 3 (5)

The inside R of a formula is substitution or an unsubstituted hydrocarbon group which has the third plass carbon or quatemary carbon which adjoins a carbonyl group, and may include a carbon carbon As a desirable embodiment, carboxylic acid metal salt of the (B) ingredient is related with a double bond

hardenability constituent given in said either which is the carboxylic acid metal salt in which the melting point has an acid radical of carboxylic acid which is 65 \*\* or less.

is a dasirable embodiment, a carbon number in which carboxylic acid metal salt of the (B) ingredient contains carbon of a carbonyl group is related with a hardonability constituent given in said either which is the carboxylic sold metal saft which has an acid radical of carboxylic sold which is 2-17. ttp://www4.ipdl.inpit.go.jp/ogi-bin/tran\_web\_ogi\_ejje?atw\_u=http%3A%2F%2Fwww4.ipdli... 2010/05/06

hardenability constituent given in said either which is metal salt of a carboxylic acid group content As a desirable ambodiment, carboxylic acid metal salt of tha (B) ingredient is related with a

quantity which serves as 0.005 - 5 weight section by metallic element conversion contained in the It is ralated with a hardenability constituent given in said either containing the (B) ingredient of compound chosen from 2-ethylhexancic acid, nec decancic acid, or naphthanic acid B) ingredient to (A) ingredient 100 weight section as a desirable embodiment.

quantity which serves as 0.005 – 5 weight soction by metallic element conversion contained in the (B) ingredient, the (C) ingredient 0.01 – 20 weight sections to (A) ingredient 100 weight section as a It is related with a hardenability constituent given in said either containing the (B) ingredient of

Best Mode of Carrying Out the Invention desirable embodiment.

Hereafter, this invention is explained in detail. 0026

Restriction in particular does not have a principal chain skeleton of an organio polymer which has a reactive silicon group used for this invention, and it can use a thing with various kinds of principal chain skeletons.

condensation polymerization of apsilon-aminoundecanoic acid, Condensation polymerization is carriad Polysulfide system polymer, Nylon 610 by the condensation polymerization of the nylon 6 by the ring opening polymerization of epsilon caprolactam, hexamethylenediamine, Nylon 66 by the condensation out from polyamide system polymer, for example, bisphenol A, and the carbonyl chlorides which have polyisoprene, isoprene or butadiene, acrylonitrile, styrene, etc., Hydrocarbon system polymers, such polyolefine system polymers; Condensation with dibasic acid, such as adipic acid, and glycol, Or the as a hydrogenation polyolefine system polymer produced by hydrogenating polybutadienes or these a two or more-ingredient ingredient among Nylon 12 by the ring opening polymerization of epsilonpolyester system polymer obtained by the ring opening polymerization of lactone; The polyacrylic ester produced by carrying out the radical polymerization of the monomers, such as ethyl acrylate and butyl acrylate, Vinyl-base polymers, such as an acrylic ester system copolymer with acrylic ester, such as ethyl acrylate and butyl acrylate, vinyl acetate, acrylonitrile, methyl methacrylate, styrene, etc., A vinyl monomer is polymerized to said organic polymer. Graft polymer: obtained. polyoxypropylene polyoxy butylene copolymer. An ethylene-propylene system copolymar, The Spacifically A polyoxyethylene, polyoxypropylene, polyoxy butylene, Polyoxy tetramethylen, a polyoxyethylene polyoxypropylana copolymer, Or polyoxyalkylene series polymers, such as a copolymer of polyisobutylene, isobutylene, isoprene, etc., polychloroprene, A copolymer with olymerization of adipic acid and hexamethylenediamine, and sebacic acid. Nylon 11 by the

chain skoleton, a polyoxyalkylene series polymer, a hydrocarbon system polymer, a polyester system polymer, a vinyl system copolymer, a polycarbonate system polymer, etc. are preferred. A saturated Since acquisition and manufacture are easy among polymers with the above-mentioned principal

amino RAURO lactam, and the above-mentioned nylon, such as copolyamide. The polycarbonate

system polymer manufactured, a diallyl phthalate system polymer etc. are illustrated.

sydrocarbon system polymer, and a polyoxyalkylene series polymer and a vinyl system copolymer have a comparatively low glass transition temperature, and their hardened material obtained is especially preferred from excelling in cold resistance.

saturated hydrocarbon system polymers, such as polyisobutylene, hydrogenation polybutadione, and invention, the reactive silicon group content saturated hydrocarbon system polymer derived from As a saturated hydrocarbon system polymer which has a reactive silicon group used for this hydrogenation polyisoprane, is raisad.

easis which can construct a bridge by formation of the siloxane bond which is a reaction which has The reactive silicon group contained in the organic polymer which has a reactive allicon group is a

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the hydroxyl group or hydrolytic basis combined with the silicon atom, and is accelerated with the

carboxylic acid metal salt which is the (B) ingredient

As a reactive silicon group, it is a general formula (1).: [0031]

Ξ

unsubstituted hydrocarbon group — it is — it is the Torl ORGAND silovy group shown. X is a universal group or hydrolyche basis discendently in sepectively. In  $(1,1,\alpha,0,1)$  is  $(1,1,\alpha,0,1)$  and and be not be immiltaneously act bo. In — an integer of  $(0,\alpha,1-1)$  — it is — a basis expressed is and been not caimfulteneously act bo. In — an integer of  $(0,\alpha,1-1)$  — it is — a basis expressed is the carbon numbers 6-20, an aralkyl group of the carbon numbers 7-20, or (R), SIO independently, R<sup>1</sup> and R<sup>2</sup> among a formula) They are an alkyl group of the carbon numbers 1-20, an aryl group of espectively. - (R') respectively — independent — substitution of the carbon numbers 1-20, or an

especially as a hydrolytic basis. A basis for which a hydrogen atom, a halogen atom, an alkoxy group, is not limited but what is necessary is just a conventionally publicly known hydrolytic basis

aminooxy group, a suifhydryl group, an alkenyloxy group, etc. are generally used concrete, for example an acyloxy group, a KETOKISHI mate group, an amino group, an amide group, an acid-amide group, an

Among these, although an alkoxy group, an amide group, and an sminooxy group are preferred, a point of hydrolysis nature being quiet and being easy to deal with it to especially an alkoxy group is

A hydrolytic basis and a hydroxyl group can be combined with one silicon atom in the 1-3 ranges, and a+sigmab) has 1-5 preferred ranges. When a hydrolytic basis and a hydroxyl group join together in two or more ] a reactive silicon group, they may be the same and may diffar.

Although a silicon atom which forms a reactive ailicon group is one or more pleces, in the case of a

silicon atom connected by siloxane bond etc., it is preferred that thay are 20 or lass places.

In particular, it is a general formula (13). :

Formula 3]



(R<sup>2</sup> and X are the same as the above among a formula.) c is an integer of 1-3. Since the reactive ilicon group expressed is easy to receive, it is preferred.

sthoxy basis, a propoxy group, and an isopropoxy group, is mentioned for X as an example in casa c is n the above-mentioned general formula (13), Tori alkoxy silyl groups, such as a methoxy group, an

nttp://www4.ipdl.inpit.go.jp/cgi-bin/tran\_web\_cgi\_ejje?atw\_u=http%3A%2F%2Fwww4.ipdl.i.. 2010/05/06 In the above-mentioned general formula (13), as an example of R<sup>2</sup> in case o is not 3, For example,

JP.2008-150627,A [DETAILED DESCRIPTION]

group, Aralkyl groups, such as aryl groups, such as a phenyl group, and benzyl, the Tori ORGANO alloxy group R'is indicated to be by 3SiO- which is a methyl group, a phenyl group, etc. (R), etc. are mentioned. In these, the point that the activity of a hydrolysis reaction is high to especially a methyl cycloalkyl groups, such as alkyl groups, such as a methyl group and an ethyl group, and a cyclohexyl

trimethoxysilyl group can reduce quantity of carboxylic acid metal salt which is the (B) ingredient, it is group, a triisopropoxy silyl group, a dimethoxymethyl silyl group, a diethoxymethylsilyl group, and a As more concrete illustration of a reactive silicon group, a trimethoxysilyl group, a triethoxy silyl disopropoxy methyl silyl group are mentioned. Its activity is high, and since especially the

What is necessary is just to perform introduction of a reactive silicon group by a publicly known method. That is, the following methods are mentioned, for example.

group content epoxy compound. Subsequently, hydrosilans which has a reactive silicon group is made to this functional group react, and obtain an organic polymer containing an unsaturation group. Or an reactivity to an organic polymer which has functional groups, such as a hydroxyl group, in a molecule unsaturation group contant organicity polymer is obtained by copolymerization with an unsaturation (b) Make an organic compound which has an active group and an unsaturation group which show to act on an acquired resultant, and it hydrosilylates. \*\*) Make a compound which has a sulfhydryl group and a reactive silicon group react to an organic polymer containing an unsaturation group produced by making it be the same as that of the (b)

reactivity to an organic polymer which has functional groups, such as a hydroxyl group, an epoxy \*\*) Make a compound which has a functional group and a reactive silicon group which show group, and an isocyanate group, in a molecule to this functional group react. 0046

group which have a hydroxyl group react to an end a method of (b) or among (\*\*)s from points, like a A method of making a compound which has a polymer, an isocyanate group, and a reactive silicon manufacturing cost becomes low in the above method is preferred. b) As an example of a hydrosilane compound used in a method, For example, trichlorosilana, methyldi: chlorosilicane, dimethylchlorosilicane, Halogenation Silang lika phenyl dichlorosilane; Trimethoxysilane, KETOKISHI mate)methylsilane ara raised, it is not limited to these. Among these, halogenation Silang dimethoxysilane; Mathyldi acetoxysilane, The acyloxy silanes lika a phenyldiacetoxysilane; although the KETOKISHI mate silanes like bis(dimethyl KETOKISHI mate)methylsilane and bis(cyclohexyl Triethoxysilane, methyldiethoxysilana, methyl dimethoxysilane, The alkoxysilane like phenyl

and alkoxysilane are especially preferred from points, like availability and hydrolysis reaction nature

(\*\*) Although a method of introducing into an uneaturation binding site of an organic polymer a

example, etc. are mentioned, it is not limited in particular. As an example of a compound of having compound which has a suifhydry! group and a reactive silicon group as a synthetic method by a radical addition reaction under a radical initiator and/or radical source-of-release existence, for riethoxysilane, gamma-mercapto propylmethyl diethoxysilane, etc. are raised, it is not limited to said sufflydryl group and a reactive silioon group, For example, although gamma-mercapto propyltrimethoxysilane, gamma-mercaptoropyl methyl dimethoxysilane, gamma-mercaptopropyl

method of making a compound which has a polymer, an isocyansta group, and a reactive silicon group which have a hydroxyl group reacting to an end among synthatic methods, it is not limited in \*\*) Atthough a method atc. which are shown in JP,H3-47825,A are mentioned, for example as a

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serticular. As an example of a compound of having said isocyanate group and a reactive silicon group, or example, although gamma-isocyanata propyltrimethoxysilane, gamma-isocyanate propylmethyl limethoxysilane, gamma-isocyanatepropyl triethoxysilane, gamma-isocyanate propylmethyl

fethoxysilane, etc. are raised, it is not limited to these.

As for a silane compound which three hydrolytic bases have combined with one silloon atoms, such ss trimethoxysilane, disproportionation may advance. If disproportionation progresses, a remarkable langerous compound [ like ] which is dimethoxysilane will arise. However, such disproportionation

propyltrimethoxysilane. For this reason, when three hydrolytic bases, such as a trimethoxysilyl group, dvances in neither gamma-mercapto propyltrimethoxysilane nor gamma-isocyanate

(A) A number average molecular weight of an organic polymer which is an ingredient, in polystyrene conversion in GPC (gel permeation chromatography), it is preferred that it is 500 to about 50,000, and ase a basis combined with one silicon atom as a silicon content group, it is preferred to use a synthetic method of (\*\*) or (\*\*).

sbout 1,000 to 30,000 liquefied thing which is, carries out and has mobility is especially preferred from points, such as the ease of dealing with it. If sufficient rubber elasticity is not obtained and 50,000 is exceeded when a number average molecular weight is less than 500, since it is lacking in mobility and nandling is difficult for it, at ordinary tamperature, it is not desirable.

not no longer be obtained. If the number of reactive silicon groups contained in a molecule will be less more pieces, and it is preferred that there are 1.1-5 pieces. Since it will become weak firmly and will secome scarce at rubber elasticity if hardenability becomes insufficient, good rubber elasticity may A) A reactive silicon group in one molecula of organic polymers which are an ingredient is one or

4 reactive silicon group may be in a main chain terminal or a side chain of an organic polymer, and than one piece, and five pieces are exceeded, it is not desirable.

may be in both. Since effective network chain density of an organic polymer component contained in a hardened material formed eventually increases especially when a reactive silicon group is in a main chain terminal, it is desirable from points, like a rubber-like hardened material of high elongation becomes is easy to be obtained with high intensity.

Said polyoxyalkylene scries polymer is a general formula intrinsically (14). :

Formula 4

alkylenc group of the carbon numbers 1-14.) — it being a polymer which has a repeating unit shown, and R3 in a general formula (14) has the carbon numbers 1-14, and also preferred straight chain among a formula, R3 is a divalent organic group and is the straight chain shape or the branching shape or branched state alkylene group of 2-4. As the example of the repeating unit shown by a

general formula (14), Formula 5

G.F.

-- OHGHO --- CHGHO--

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JP,2008-150627,A [DETAILED DESCRIPTION]

\*\* is mentioned. The principal chain skaleton of a polyoxyalkylene series polymer may consist of ons kind of repeating unit, and may consist of two or more kinds of repeating units. When used especially for sealant etc., it is dasirable from that what comprises the polymer which uses a polyoxypropylene system polymer as the main ingredients is amorphous, or the point which is hypoviscosity

As a synthetic method of a polyoxyalkylene series polymer, For example, the polymerizing method by

tem, a U.S. Pat. No. 3278458 item, A U.S. Pat. No. 3278459 item, a U.S. Pat. No. 3427256 item, a U.S. complex catalyst like a complex produced by making an organoaluminium compound and porphyrin which are shown in JP,81-2156234 react, JP,48-27256,B, JP,59-15336,B, a U.S. Pat. No. 3278457 Pat. No. 3427334 item. The polymerizing method by a composite metal cyanide complex catalyst an alkali catalyst like KOH, the polymerizing method by a transition metal compound-porphyrin JP,H11-060722,A, are not limited in particular. In a principal chain skeleton of the above-mentioned polyoxyalkylana serias polymer, other ingredients, such as a urathana bond ingredient, may be included in the range which does not spoil an effect of this invention greatly.

and polyol which has a repeating unit of the above-mentioned general formula (14) can be mentioned tolylene diisocyanate, Aromatic system polyisocyanates, such as diphenylmethane diisocyanate and compounds, such as aliphatic series system polyisocyanates, such as hexamethylene di-isocyanate, cylche discovanate: Isophorone discovanate, What is obtained from a reaction of polyisocyanate It is not limited especially as the above-mentioned urethane bond ingredient, but For example,

A manufacturing method of a polyoxyalkylene series polymer which has a reactive silicon group,

JP,81-197631,A, JP,61-215622,A, JP,61-215623,A, JP,61-218632,A, JP,H3-72527,A, JP,H3-47825,A, JP,57-164123,A, JP,3-2450,B, a U.S. Pat. No. 3622557 item, What is proposed by each gazette, such JP,45-36319,B, JP,46-12154,B, JP,50-156599,A, JP,54-6096,A, JP,55-13767,A, JP,55-13468,A, as a U.S. Pat. No. 4345053 item, a U.S. Pat. No. 4365307 item, and a U.S. Pat. No. 4960844 item, Although it is indicated by each gazette of JP,H8-231707,A and 6,000 or more number avarage molecular weights and Mw/Mn (ratio of weight average molacular waight and a number average

molecular weight) can use conveniently a polyoxyalkylene series polymer with narrow molecular weight distribution in the 1.8 or lass amount of Polymor Division, It is not limited to in particular

A polyoxyalkylene series polymer which has the above-mentloned reactive silicon group may be used alone, and may be used together two or more sorts. [0064]

A polymer which makes a skeleton of a saturated hydrocarbon system polymer which has a reactive silicon group used for this invention, (1). [ whether an olefinic compound of the carbon numbers 1-6, such as ethylene, propylene, 1-butene, and isobutylene, is polymerized as the main ingredients, and  $\mathbb I$ 

polymer tend to introduce a functional group into an end, and tend to control a molecular weight and can increase the number of end functional groups, they are preferred. hydrogenating, but. Since an isobutylene system polymer and a hydrogenation polybutadiene system (2) After making diene series, such as butadiene and isoprene, homopolymerize or carrying out copolymerization to the above-mentioned elefinio compound, can obtain by a method of

All the monomaric units may be formed from an isobutylene unit, and an isobutylena system polymer It is [ in an isobutylene system polymer ] desirable, and a monomeric unit which has isobutylene and copolymeric may be especially contained in 10 or less % of the weight of the range preferably 30 or nttp://www4.ipdl.inpit.go.jp/ogi-bin/tran\_web\_ogi\_ejje?atw\_u=http%3A%2F%2Fwww4.ipdli... 2010/05/06

ess % of the weight still more proforably 50 or less % of the weight. In an isobutylane system polymer, when content of a monomeric unit which has isobutylane and copolymeric exceeds 50 % of the weight, since characteristic physical properties, such as high weatherability, high haat realstance, low moisture permeability, etc. resulting from an isobutylene skelaton, are not fully revaaled, it is not

As such a monomer component, an olefin of the carbon numbers 4-12, vinyl ether, an aromatic vinyl compound, vinyisilane, end aryisilane are raised, for example. As such a copolymer component, for

vinyldimethylmethoxysilane, Vinyl trimethylsilane, divinyl dichlorosilane, divinyl dimethoxysilane, Divinyl example 1-butene, 2-butene, A 2-methyl-1-butene, a 3-methyl-1-butene, a pentene, 4-methyl-1centene, A hexene, a vinylcyclohcxcne, the methyl vinyl ether, ethyl vinyl ether, Isobutylvinyl ether, styrene, alpha-methylstyrene, dimethylstyrene. Monochlorostyrene, dichlorostyrene, beta-pinene, indene, vinyl trichlorosilane, Vinyl methyldi chlorosilicane, vinyldimethylchlorosilicane,

illyldimethyl methoxysilane, allyl trimethylsilane, diaryl dichlorosilano, diaryl dimethoxysilane, diaryl dinethylsilane, gamma-methacryloyl oxypropyl trimethoxysilane, gamma-methacryloyl oxypropyl ilmethylsilane, the 1,3-divinyl- 1, 1, and 3, 3-tetramethyl disiloxane, TORIBI nil methylsilane, a etravinyl silane, allyltrichlorosilane, Allyl methyldi chlorosilicane, allyldimethylchlorosilicane,

nathyl dimethoxysilanc etc. are raised.

aryisilane are used, a basis which allicon contant increases and can act as a silane coupling agent will As a monomeric unit which has isobutylene and copolymeric among the abova, if vinylsilane and ncrease, and the adheaive property of a constituent obtained will improve.

ngredients like a case of the above-mentioned isobutylene system polymer in a hydrogenation Other monomeric units may be made to contain besides a monomeric unit used as the main

oolybutadiene system polymer or other saturated hydrocarbon system polymers.

invention is attained may be made to contain in 1 or less % of the weight of the range preferably especially 5 or less % of the weight still more preferably 10 or less % of the weight. compounds, such as butadiene and isoprene, remains in the range in which the purpose of this o a saturated hydrocarbon system polymer which has a reactive silicon group used for this nvention. A little monomeric units in which an efter-polymerization double band like polyene

00717

A satureted hydrocarbon system polymer which has these reactive silloon groups can be ndependent, or can be used together two or more sorts.

A process of a saturated hydrocarbon system polymer which has a reactive silicon group next is explained. An isobutylene system polymer which has a reactive allicon group in molecular chain terminals among isobutylene system polymers which have a reactive silicon group, an end organic-functions type process of a seturated hydrocarbon system polymer which has a reactive silicon group. For example, manufacture preferably using a whole end organic-functions type isobutylene system polymer. As a combining and [ which is called iniphor ] and a chain transfer agent) called iniphor method --- it can eneral formula (15) after obtaining polyisobutylene which has an unseturation group at the end by obtained by the polymerizing method (cationic polymerization method using a specific compound combination obtained by a polymerization reaction, the reaction of an end of a polymer and allyl ichydrohalogenation reaction of an end of a polymer which has third class carbon-chlorine

rimethylsilane which have third class carbon-chlorine combination, etc.:

ormula 6] 0074

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(this compound is a compound which the hydrogen atom combined with the basis expressed with a (R<sup>1</sup>, R<sup>2</sup>, X, m, a, and b are the same as the ebova emong a formula.) — the hydrosilane compound general formula (1),) expressed — desirable — general formula (16):

[Formuls 7]

(16)

(R², X, and c are the same as the above emong a formula.) — it can obtain by the reaction (hydrositylation reaction) to which the hydrosilans compound expressed is made to add using a

platinum catalyst.

acetoxyalane. The ecyloxy allanes like a phenyddacetoxyalane; alethough the KETDKISH meta silances illances in before the beforehold KETDKISH matchinylysilane and biekcyclobroxyl KETDKISHI matchinsbytalane ere raised, it is not be infect or these. Among these, hekograntion Slams and alkoxyalane are preferred As a hydrosilane compound, for example Trichlorosilane, methyldi chlorosilicane, Halogenation Silang methyldiethoxysilane, methyl dimathoxyailane, The alkoxysilane like phenyl dimethoxysilane; Methyldi ika dimathylchlorosilicene and phenyl dichlorosilane; Trimethoxysilane. Triethoxysilene, especially in respect of the ease of acquisition, etc.

Such a manufacturing method is indicated in each gazette of JP.4-69659.B. JP.7-108928.B, JP.63-254149,A, JP,64-22904,A, and the patent No. 2539445, for example.

manufactured by adding and carrying out copolymerization of the vinylsilane and arylsilane which have An isobutylene system polymer which has a reactive silicon group in a chain side chein is e reactive silicon group into a monomer containing isobutylene.

group in an end and a chain side chain is manufactured by introducing a reactive silicon group into an has a reactive silicon group in molecular chein terminals. After carrying out copolymerization of the monomer which is the main ingradients, an isobutylene system polymer which has a reactive ailicon in the case of a polymerization reaction which manufacturas an isobutylene system polymer which vinylailane end erylsilane etc. which have a reactive silicon group in addition to an isobutylene

As the vinyIsilane which has a reactive silicon group, and aryIsilane. For example, vinyI trichlorosilane. [0082]

allyidimethylchlorosilicane. Allyidimethyl methoxysilane, diaryl dichlorosilane, diaryl dimethoxysilane. vinyl methyldi chlorosilicane, vinyldimethylchlorosilicane, Vinyldimethylmethoxysilane, divinyl gamma-methacryloyl oxypropyl trimethoxysilene, gamma-methacryloyl oxypropyl methyl dichlorosilane, divinyl dimethoxysilane, Allytrichlorosilane, allyl methyldi chlorosilicane, limethoxysilane, etc. are raised.

group. A hydrogenation polybutadiene polymerization object which has a reactive silicon group can be sequired by the hydrosilylation reaction of a hydrogenation polybutadiene polymarization object which has an olefin group. General formula (17) after a hydroganation polybutadiene system polymer which has an end olefin group usea a hydroxyl group of an end hydroxy hydroganation polybutadiene system In this invention, a hydrogenation polybutadiene polymerization object which has a reactive silicon group can be mentioned as a saturated hydrocarbon system polymer which has a reactive silicon

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olymer as oxy metal groups, such as -ONa and -O.K., first, for example :

-jalogen atoms, such as a chlorine atom, a bromine atom, and iodina atoms, and R<sup>4</sup> are among [type, and Y is -R<sup>5</sup>-. -R<sup>5</sup>-000-, or -R<sup>5</sup>-CO. - (R<sup>5</sup> is a divalent hydrocarbon group of the carbon numbers -20, and) an alkylene group, a cyclo alkylene group, an allylene group, and an aralkylene group — it s desirable — by a divalent organic group shown. ~ It can obtain by making an organic halogenated compound shown by especially a divalent basis chosen from CH2- and -R"-C<sub>6</sub>H4-CH2- (R" is a

nydrocarbon group of the carbon numbers 1-10) being preferred] react.

system polymer as a oxy metal group, A method of making it react to alkaline-water oxides, such as Na. metal alkoxide; NaOH like metal hydride; NaOCH3 like alkaline metal; NaH like K, and KOH, etc. is As a method of using terminal hydroxyl groups of an end hydroxy hydrogenation polybutadiene

organic halogenated compound which contains two or more halogan in one molecule, and is shown by a general formula (17) after that, A hydrogenation polybutadiene system polymer which is the amount weight as an and hydroxy hydrogenation polybutadiene system polymar used as a starting material is Although an end olefin hydrogenation polybutadiene system polymer with the almost same molecular eact to obtain a polymar of the amount of Polymer Division mora, at the time, such as a methylene salogenated compound which can increase a molecular weight if it is made to react to a multivalent obtained in said method, Before making an organic halogenated compound of a general formula (17) thloride, bis(chloromethy))benzene, and bis(chloromethyl)ether. If it is made to react to an organic of Polymer Division more, and has an olefin group at the end can be obtained.

As an example of an organic halogenated compound shown by said general formula (17). For example, an allyl chloride, an allyl star's picture, viryl (chloromethyl) benzene, Allyl (chloromethyl) benzene, allyl (bromomethyl) benzene, Although allyl (chloromethyl) ether, allyl(chloromethoxy) benzene, 1-butonyl (chloromethyl) ether, 1-hexenyl(chloromethoxy) benzene, allyloxy (chloromethyl) benzene, ctc. are aised, it is not limited to them. Among these, an allyl chloride is cheap, and since it moreover reacts

easily, it is desirable.

in a hydrosilane compound like a case of an isobutylene system polymar which has a reactive sificon colymer may be manufactured by carrying out an addition reaction using a platinum system catalyst introduction of a reactive silicon group to said end olefin hydrogenation polybutadiene system group in molecular chain terminals.

bove does not contain substantially an unsaturated bond which is not an aromatic ring in a molacule, Compared with a sealing agent etc. which consist of a conventional rubber system polymer like an vestherability becomes good remarkably. Since this polymer is a hydrocarbon system polymer, its vater resisting property is good, and a low hardened material of humidity permeability is obtained. When a saturated hydrocarbon system polymer which has a reactive silicon group as mentioned organic system polymer or an oxyalkylene system polymer which has an unsaturated bond,

ogether two or more sorts. Specifically, a polyoxyalkylene series polymer which has a reactive silicon solymer which has a reactive silicon group, and an organic polymer which blends two or more sorts An organic polymer which has these reactive silicon groups may be used alone, and may be used group, a saturated hydrocarbon system polymer which has a reactive silicon group, a vinyl-base chosen from a group, \*\* and others, can also be used.

A manufacturing method of an organic polymer which blends a polyozoslavlene series polymer which has a reachos allicon group, and a viny-base polymer which has a reactive allicon group, and a viny-base polymer which has a reactive allicon group, Although has indicated by LP39-12264, by 1930-112642, JP346-172631A, DFHI I-110793A, etc., it's not

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A desirable example has a reactive silicon group and a chain is a following general formula substantially (18):

the acrylic ester monomer unit which has an alkyl group of the carbon numbers 1-8 expressed with (a hydrogen atom or a methyl group, and R<sup>2</sup> show the alkyl group of the carbon numbers 1-8 among a formula, as for R<sup>6</sup>) (meta-), and following general formula (19):

which has a with a carbon numbers of ten or more expressed alkyl group (meta-). It is the method of (-- the inside of a formula, and R<sup>6</sup> -- the above -- the same -- R<sup>8</sup> shows a with a carbon numbers of ten or more alkyl group ---) --- to the copolymer which consists of an acrylic ester monomer unit

blending and manufacturing the polyoxyalkylene series polymer which has a reactive silicon group. Acrylic acid (meta) expresses acrylic acid and/or methacrylic acid with the above-mentioned

propyl group, n-butyl group, t-butyl group, a 2-cthylhexyl group, etc. -- desirable -- 1-4 -- an alkyl as R7 of said general formula (18) — the carbon numbers 1-8 of a methyl group, an ethyl group, a group of 1–2 is raised still more preferably. An alkyl group of  $\mathbb{R}^7$  may be independent and may be as R<sup>8</sup> of said general formula (19) — ten or more carbon numbars of a lauryl group, a tridecyl group, a oetyl group, a stearyl group, a behenyl group, etc. — usually — 10-30 — a long-chain alkyl group of 0-20 is raised prefarably. Like a case of R7, an alkyl group of R8 may be independent and may ba

mixed two or more sorts.

mixed two or more sorts.

Abhough a chain of this vinyl system copolymer consists of a monomoriou unit of a formula (18) and a formula (18) substantially, a "real target" force means that the arm total of a monomeric unit of a formula (18) substantially, a "real target" form a formula (18) surpasses S0 % of the weight. The surpasses Lot weight or more that of formula (18) and a formula (18) in 70 % of the weight or more

From a point of compatibility with a polyoxyalkolene series polymer, as for an abundance ratio of a monomeric unit of a formula (18), and a monomeric unit of a formula (19), 95:5-40:80 are preferred at a weight ratio, and 90:10-60:40 are still more preferred.

methylolmethacrylamide, Epoxy groups, such as glyoidyl acrylate and glycidyl methacrylate. Diethylamino ethyl sorylate, diethylamino ethyl methacrylate, A monomer containing amino groups. As monomeric units other than a formula (18) which may be contained in this copolymer, and a formula (19), For example, carboxylic soid groups, such as acrylic soid and methacrylic soid, acrylamide, Amide groups, such as methacrylamide, N-methylolacrylamide, and N-

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such as aminostryl vinyl ether, a monomeric unit which originates in acrylonitrile, styrene, alpha-metrylstyrene, alkyl vinyl ether, VOM/PVC, vinyl scetate, vinyl propionate, ethylene, etc. in addition

Although an organic polymer which blends a saturated hydrocarbon system system polymer which has a reactive silicon group, and a vinyl-base polymer which has a reactive silicon group is indicated by JP,H1-168764,A, JP,2000-186176,A, etc., it is not limited to in particular these. A method of polymerizing an acrylic ester (meta) system monomer elsewhere under existence of an prganic polymer which has a reactive silicon group as a manufacturing method of an organic polymer which blends a vinyl-base polymer which has a reactive silicon group can be used. Although this manufacturing method is concretely indicated by each gazette, such as JP.59-78223.A, JP.59-68014,A, JP,60-228516,A, and JP,60-228517,A, it is not limited to these.

Jarboxylic acid vanadium, carboxylic acid iron, carboxylic acid titanlum, carboxylic acid potassium, Carboxylic acid calcium used as a (B) ingredient in a hardenability constituent of this invention.

manganese, oarboxylic acid nickel, carboxylic acid cobsit, and a carboxylic acid zirconium. It functions as what is called a silanol condensation eatalyst in which a siloxane bond may be made to form from One or more sorts of carboxyllo acid metal salt chosen from carboxyllo acid barium, carboxylic acid a hydroxyl group combined with a silicon atom contained in an organic polymer which is the (A) ngredient of this invention, or a hydrolytic basis. n said carboxylic acid metal salt, carboxylic acid calcium, carboxylic acid vanadium. Carboxylic acid ron, carboxylic sold titanium, carboxylic sold potassium, carboxylic sold barium, carboxylic sold

catalyst is high, carboxyllo acid calcium, carboxylic acid vanadium, carboxyllo acid iron, carboxylic acid nanganese, and a carboxylic soid zirconium, it is more desirable from a point that the activity of a titanium, and a carboxylic acid zirconium are still more preferred, and carboxylic acid iron and parboxylic acid titanium are especially the most preferred.

octassium, carboxylic acid barium, carboxylic acid manganese, carboxylic acid nickel, carboxylic acid nardenability constituent obtained, and a point that the heat resistance of a hardened material and oobalt, and a carboxylic said zirconium, It is more desirable from a point with little coloring of a weatherability which are obtained are high, and carboxylic acid calcium, carboxylic acid titanium, carboxylic acid potassium, carboxylic acid barium, and a carboxylic acid zirconium are still more Carboxylic acid calcium, carboxylic acid vanadium, carboxylic acid titanium. Carboxylic acid

This (B) ingredient uses as the main ingredients carboxylio acid matal salt expressed with general formula (2) - (12), respectively.

preferred.

Ca(OCOR) 2 (2)

-6(OCOR) 2 (4) V(OCOR) 3 (3)

Fe(OCOR) 3 (5) ri(0000R) 4 (6)

3a(OCOR) 2 (8) Mn(OCOR) 2 (9) ((OCOR) (7)

nickel(OCOR), (10) 3o(OCOR), (11)

Zr(0) (0COR), (12)

The inside R of a formula is substitution or an unsubstituted hydrocarbon group, and may include a carbon carbon double bond.) rttp://www4.ipdl.inpit.go.jp/cgi-bin/tran\_web\_cgi\_ejje?atw\_u=http%3A%2F%2Fwww4.ipdl.i.. 2010/05/06

JP,2008-150627,A [DETAILED DESCRIPTION]

As oarboxylic acid, a carboxylic acid group contant compound of a hydrocarbon system of 2-40 is carboxylic acid group content compound of a hydrocarbon system of the carbon numbers 2-20 used suitably, and a carbon number including carbonyl carbons may be especially used for a suitably from a point of availability here.

Enanthio acid, caprylic acid, 2-ethylhexanoic acid, pelargonic acid, capric acid. Undecanoic acid, lauric nonadecandic acid, arachin acid, Behenic acid, lignoceric acid, cerinic acid, montanic acid, melissic acid, Straight chain saturated fatty acid groups, such as RAKUSERU acid; Undocylenic acid, Linder acid, Tsuzuio acid, FIZETERIN acid, myristolcic acid, 2-hexadecenoic acid, 6-hexadecenoic acid, 7blaidic acid, ASUKUREPIN acid, vaccenic acid, gadolcic acid, Gondo Inn acid, a cetoleic acid, erucic When it illustrates concretely, scetic acid, propionic acid, butanoic acid, a valaric acid, caproic acid, nexadecenois acid, palmitoleic acid, a petrosclinic acid, Monoene unsaturations, such as oleic acid, acid, tridecylacid, myristic soid, pentadecyl scid, Pulmitic soid, heptadecylacid, stearic scid, acid, brassidic acid, selecholoic acid, KISHIMEN acid, and RUMEKUEN acid

eleostearic acid, punicic acid, linolenic acid, 8,11,14~eicosatrienoic acid, a 7,10,13~docosatrienoic acid 8,12,16,19-docosstetraanolo acid, 4,8,12,15,18-eicosapentaenoio acid, Polyene unsaturated fatty acid Chine scid; Naphthenio scid. A malvalic scid, sterculic scid, HIDONO carbyne scid, chaulmoogric scid. hydroxyoctadecanoic acid, 9,10-dihydroxyoctadecanoic acid, Oxygenated fatty acid, such as recinoleic acid, cam ROREN acid, licanic acid, ferron acid, and cerebronic acid; dicarboxylic acid, such as succinio acid, glutario acid, adipic acid, pimelic acid, SUPERIN acid, azelaic acid, and sebacic acid. as anteiso aoid, tuberculostearic acid, a pivalic acid, and neo decanoic acid, A taririo acid, Fatty acid such as clupanodonic acid, herring acid, and docosahexaanoic acid; Iso acid, Branch fatty acid, such with triple bonds, such as steer roll sold, a crepenynic sold, KISHIMENIN sold, and 7-hexs creperde Alicyclic carvone acids, such as gorlic acid; Sabinio acid, 2-hydroxytetradecancic acid, IPURORU atty acid. Linolic acid, 10,12-octadecadiencic acid, HIRAGO acid, Alpha-eleostearic acid, betaacid, 2-hydroxyhexadecenoic acid, YARAPI Norian acid, uni-PERIN acid, AMBURETTORU acid, 4.8.11.14-hexadeca tetraenoic acid, MOROKUCHI acid, steer RIDON acid, Arachidonic acid, ARYURITTO acid, 2-hydroxyoctadecanoic acid, 12-hydroxyoctadecanoic acid, 18-

that it is 65 \*\* or less, it is more preferred that it is -50-50 \*\*, and it is preferred that it is especially when the melting point of said carboxylic soid is high (crystallinity is high), the melting point becomes high in a similar manner, and it is hard to deal with carboxylic sold metal sait which has the acid radical (workability -- bad). Therefore, as for the melting point of said carboxylic acid, it is preferred

extended a constituent thinly, volatilization by heating may be large and catalyst ability of carboxylic soid metal salt may fall greatly. Therefore, as for said carboxylic soid, it is preferred that carbon numbers including carbon of a carbonyl group are 2-17, it is more preferred that it is 3-13, and it is mostly an ingredient which volatilizes easily with heating. Especially on conditions (thin layer) which when a carbon number of said carboxylic acid is large (a molecular weight is large), it becomes preferred that it is especially 5-10.

good to said carboxylic scid has 2-ethylhexanoic scid, octylic scid, neo decanoic scid, oleic scid, or preferred naphthenic scid. Said naphthenic scid se expressed with an empirical formula (20). especially acquisition is easy, and is cheap and a point that compatibility with the (A) ingredient is

carboxylic acid (2-ethylhaxanoic acid etc.) whose carbon atoma in which said carboxylic acid adjoins quaternary carbon A pivalic scid etc. are more preferred from a cure rate being quick, and especially a carbonyl group are the third class carbon and carboxylic soid (nee decanoic acid.) which is CnH<sub>2rr-2</sub>O<sub>2</sub> (20)

carboxylic acid whose carbon atom which adjoins a carbonyl group is quaternary carbon is preferred.

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salt, 2-ethylhexanoio soid iron (divalent), 2-ethylhexanolo soid iron (trivialent), 2-ethylhexanoio soid Itanium (detrawlations), 2-ethylexanoino soid vanadiam (trivialent), 2-ethylhexanoio soid osloim (finalent), 2-ethylexanoio soid potassium (trivialent), 2-ethylhexanoio soid parum (divisent), 2-ethylhexanoio soid potassium (trivialent), 2-ethylhexanoio soid potassium (trivialent), 2-ethylhexanoio soid potassium (trivialent), 2-ethylhexanoio soid barum (divisent), 2-ethylhexanoio soid barum (divisent), 2-ethylhexanoio soid potassium (trivialent), 2-ethylhexanoio soid barum (divisent), 2-ethylhexanoio soid potassium (trivialent), 2-ethylhexanoio soid barum (divisent), 2 From a viewpoint of avallability and compatibility, as an example of desirable carboxylic acid metal

oobalt (divalent), 2-ethylhexanolo acid zirconium (totravalence), neo decanolo acid iron (divalent), Neo decanois acid fron (trivalent), nos decanois acid thantum (tetranslanos), nos decanois acid vanadium thinient), nes decanois acid calculur divinento, hos decanois acid obstassium (univalent), neo decanois acid habrim (Ajvalent), a nos decanois acid zizoonium (tetravialence).

cthylhexenoic soid manganese (divalent), 2-ethylhexenoic soid nickal (divalent), 2-ethylhexenoic soid

ranadium (trivalent), oleic soid calcium (divalent), oleic soid potassium (univalent), Oleic soid barium aphthenate (divalent), naphthenio acid nickel (divalent), cobalt naphthanate (divalent), a naphthenio saphthenic acid titanium (tetravalence), naphthenic acid vanadium (trivalent), Calcium naphthenate sleic acid zirconium (tetravalence), naphthenic acid iron (divalent), Naphthenic acid iron (trivalent), divalent), manganese oleate (divalent), oleic soid nickel (divalent), Oleic soid oobsit (divalent), an Dieic aoid iron (divalent), oleic acid iron (trivalent), oleic acid titanium (tetravalence), Oleic acid divalent), naphthenic acid potassium (univalent), naphthenic acid barium (divalent), manganese

soid zirconium (tetravalence), etc. are mentioned.

2-ethylhexanoic acid iron (divalent) from a viewpoint of catalytic activity, 2-ethylhexanoic acid iron decanoio acid iron (trivslent), neo decanoic acid titanium (tetravalance), oleic acid iron (divalent). trivalent), 2-ethylhexanoic acid titanium (tetravalence), neo decanoic acid iron (divalent). Neo Diejo acid iron (trivalent), olalo acid titanium (tetravalence), naphthanic acid iron (divalent),

Naphthenic acid iron (trivalent) and naphthenic acid thanium (totravalence) are more preferred, and 2-ethylhexanoic acid iron (trivalent), neo decanoic acid iron (trivalent), and especially naphthenic acid iron (trivalent) are preferred.
[0113]

calcium (divalent), 2-ethylhexanoic acid potassium (univalent), 2-ethylhexanoic acid barium (divalent), From a viewpoint of coloring to 2-ethylhexancic acid titanium (tetravalence). 2-ethylhexancic acid

divalent), a neo decanoic acid zirconium (tetravalence). Olcic acid titanium (tetravalence), olcic acid calcium (divalent), olcic acid potassium (univalent). Olcic acid barium (divalent), an olcic acid decanoic acid calcium (divalent). Neo decanoic acid potassium (univalent), neo decanoic acid barium diroonium (tetravalence), naphthenic acid titanium (tetravalence), calcium naphthenate (divalent), aphthenic acid potassium (univalant), naphthenic acid barium (divalent), and a naphthenic acid -ethylhexanoic acid zirconium (tetravalence). Neo decanoic acid titanium (tetravalence), neo

sodium hydroxide react, and makea solution of hard soap, Solution of metal salt prepared apart from Such carboxylic acid metal salt makes a carboxylic acid group content compound, or its ester and irconium (tetravalenca) are more preferred.

nethod to which a carboxylic soid group content compound and metal powder are made to react. ] an his In addition, a sedimentation method which settles metallic scap. A carboxylic acid group content compound or its ester and metaled hydroxide, an oxide, A method etc. to which an alcoholate or a chloride, and a carboxylic acid group content compound are made to react in [ else /, such as scorification to which a weak acid salt is made to react at an elevated temperature, and direct anhydrous organic solvent are taken.

4s for such carboxylic scid metal salt, it is preferred to dilute with diluting solvents, such as a mineral spirit, toluene, hexylene glycol, a diethylene glycol, a paraffin oil, and dioctyl phthalate, and to be used with a gestalt of a solution whose metal content is about 1 to 40 % of the weight. 0115

(B) About 0.005-5 weight sections are preferred at metallic element conversion contained in the (B) ngredient to (A) ingredient 100 weight section as amount of ingredient used, and also about 0.01-3 weight aections are preferred. (B) Since a cure rate may become slow and a hardaning reaction will secome fully difficult to advance if loadings of an ingredient are less than this range, it is not nttp://www4.ipdl.inpit.go.jp/cgi~bin/tran\_web\_ogi\_ejje?atw\_u=http%3A%2F%2Fwww4.ipdl.i.. 2010/05/06

leairable. On the other hand, pot life becomes short too much and is not preferred from a point of

workability except that a good hardened material will become generation of heat and foaming local at the time of hardening arise, and is hard to be obtained, if loadings of the (B) ingredient exceed this

using it alone, it can be used combining two or more sorts, and also can use together with carboxylic manganese, carboxylic acid nickel, carboxylic acid cobalt, and a carboxylic acid zirconium, Besides acid tin salt, carboxylic acid lead salt, carboxylic acid bismuth salt, carboxylic acid ceric salt, etc. Carboxylio soid titanium, carboxylio soid potassium, carboxylio soid barium, carboxylio soid The aforementioned carboxyllo acid calcium, carboxylic acid vanadium, carboxyllo acid Iron

example, Specifically Methylamine, ethylamine, propylamine, isopropylamine, A butylamine, amyl amine, On the other hand, only with carboxylic acid metal salt of the (B) ingredient, activity is low, and when rexylamine, octylamine, 2-ethylhexylamine, Nonyl amine, dccyl amine, lauryl amine, pentadecyl amine, moderate hardenability is not acquired, various amine compounds which are the (C) ingredients as a co-catalyst can be added. As various amine compounds, although indicated to JP.H5-287187,A, for Dimethylamine, Diethylamine, dipropyl amine, disopropylamine, dibutyl amine, diamylamine, dioetyl Aliphatic series primary amines, such as Sept Iles amine, stearylamine, and cyclohexylamine;

Amine, JISECHIRU amine, distearyl amine, methylstearylamine, Aliphatio sarias secondary amines. such se ethylstearylamine and butylstearylamine; Triethylamine, Aliphatio series tertlary amines, euch se triamylamine, trihaxyl amine, and trioctylamine; Triaryl amine, Aliphatic seriae unsaturation amines, such as oleylamine; Lauryl aniline, As aromatic amine [, such as stearylaniline, a triphenylamine N.Nlimethylaniline, and dimethylbenzyl aniline, J. and other amines, Monoethanolamine, diethanolamine, amine, di(2-ethylhexyl) amine, didacyl amine, dilauryl

ettyrjene diamine, 2,4,6-tris(dimethyl aminomethyl) phenol, Although morpholine, N-methylmorpholine, 2-ethyl-4-methylimidazole, 1, and 8-diazabicyclo (5, 4, 0) undecene 7 (DBU) etc. are mentioned, it is etraethylenepentamine, benzylamine, diethylamino propylamine, Xylylene diamine, ethylenediamine. Guanidine, diphenylguanidine, N.N.N., and N"-tetramethyl 1,3-butanediamine, N.N.N", N"-tetramethyl nexamethylenediamine, Dodecamethylenediamine, dimethylethylenediamine, tricthylenediamine, criethanolamine. Dimethylamino ethanol, diethylenetriamine, triethylenetetramine, not limited to these.

combined. As an example of this hydrolytic silicon group, X can mention a thing which is a hydrolytic In this invention, an amino group content silane coupling agent can also be used as a (G) ingredient Said amino group content silane coupling agent is a compound which has a basis (henceforth a hydrolytic silicon group) and an amino group containing a silicon atom which a hydrolytic basis

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hydrolytic basis can specifically be mentioned, a methoxy group, an ethoxy basis, atc. are preferred basis among bases expressed with a general formula (1). Although a basis siready illustrated as a from a point of a hydrolysis rate. As for especially the two or more number of a hydrolytic basis. three or more pieces are prefarred. As an example of an amino group content silane coupling agent, gamma-aminopropyl trimethoxysilane gamma-aminopropyl triethoxysilane, gamma-aminopropyl triisopropoxy silane, gamma-aminopropyl methyl dimethoxysilanc, gamma-aminopropyl methyldiethoxysilanc, gamma-(2-aminoethyl)

aminopropyl trimethoxysilane, gamma-(2-aminoethyl) aminopropyl methyl dimethoxysilane, gamma-(2-aminoethyl) aminopropyl triethoxysilane, gamma-(2-aminoethyl) aminopropyl methyldiethoxysilane. vinylbenzyl gamma-aminopropyl triethoxysilane, etc. can be mentioned. Amino modifying silyl polymer which is the denatured derivative, silanizing amino polymer, an unsaturation aminosilane complex, a phenylamino long chain alkyl silane, amino silanizing silicone, etc. can usc these. The abovementioned amino group content silane coupling agent may be used only by one kind, and may carry gamma-(2-aninoetryl) aninopropyl triisopropoxy silane, gamma-ureido propyltrinethoxysilane, N-phenyl-gamma-aminopropyl trimethoxysilane, N-benzyl-gamma-aminopropyl trimethoxysilane, N-

As these (G) ingredients, since co-catalyst ability changes greatly with structura of the (C) ingredient tself, compatibility with the (A) ingredient, etc., it is preferred to choose a compound which was

out two or more kind mixing use.

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dicyclohexylamine, are preferred from a point that co-catalyst ability is high.

weight sections are preferred to organic polymer 100 weight section of the (A) ingredient, and also its 5.1 – 5 weight section is more preferred. A cure rate may become it slow that loadings of an amine advance. On the other hand, if loadings of an amine compound exceed 20 weight sections, pot life As for loadings of an amina compound which is the aforementioned (C) ingredient, about 0.01-20 compound are less than 0.01 weight sections, and a hardening reaction becomes fully difficult to

Silane coupling agents other than an amino group content silane coupling agent can also be used for a constituent of this invention.

may become short too much and is not preferred from a point of workability.

As functional groups other than an amino group, a sulfhydryl group, an epoxy group, a carboxyl group,

a vinyl group, an isocyanate group, isocyanurate, halogen, etc. can be illustrated.

chloropropyltrimetoxysilane. ]: --- isocyanurate silanes [, such as tris (trimethoxysilyl) isocyanurate, ]. polyester, etc. which are the derivatives which denaturalized these can be used as a silane coupling propyltriethoxysilane, gamma-glycidoxy propyl methyldimethoxysilana, beta-(3, 4-epoxycyolohexyl) As an example of ellane coupling agents other than an amino group content ellane coupling agent, gamma-mercapto propyltrinethoxysilane, gamma-mercaptopropyl triethoxysilane, Sulfhydyl group oxypropyl methyl dimethoxysilane, vinyl type unsaturation group content Silang [, such as gammaisocyanate propylmethyl dimethoxysilane, can be mentioned. A block isocyanate silane, silanizing socyanatepropyl triethoxysilane, gamma-isocyanate propylmethyl diethoxysilane, and gamma-AKURO yloxy propylmethyl tricthoxysilane, ]; — containing halogen Silang L such as gammacontent Silang, such as gamma-mercaptpropylmethyl dimethoxysilane and gamma-mercapto aminopropyl trimethoxysilane; Vinyltrimetoxysilane, vinyltriethoxysilane, gamma-mothacryloyl socyanate group content Silang, such as gamma-isocyanate propyltrimethoxysilane, gammanethoxyethoxy)Silang, Carboxysilanes, such as N-beta-(carboxymethyl) aminoethyl gammathyltrimethoxysilane, Epoxy group content Silang, such as beta-(3.4-cpoxycyolohexyl) sthyltricthoxysilane; beta-carboxyethyl triethoxysilane, beta-carboxyethyl phenylbis(2propylmethyl diethoxysilane; Gamma-glycidoxypropyltrimetoxysilane, gamma-glycidoxy

The amount of [ in case used of using silane coupling agents other than an amino group content silane coupling agent ] has 0,01 - 20 preferred weight section to (A) ingredient 100 weight section, and also its 0.1 - 5 waight section is more preferred.

silica, Orystalline silica, fused silica, dolomite, a silicio acid anhydride, carbon black, calcium carbonate, clay, talo, titanium oxide, aluminium hydroxide, magnesium carbonate, aluminum impalpable citanium oxide, talo, etc. are more preferred than points, such as a reinforcing effect, the increase-inquantity effect, and an ease of acquisition. These fillers may be used independently and may be used together two or more sorts. The amount of Lin case used of using a filler I has 10 – 1000 preferred weight section to (A) ingredient 100 weight section, and its 50 – 300 weight section is still more /arious fillers can be used for a hardenability constituent of this invention if needed. As an example nica, walnut shell powder, chaff powder, Graphite, diatomite, clay, fume silica, sedimentation nature bowder, the Flint powder, the end of zinc dust, etc. are raised. Among these fillers, sedimentation nature silica, fume silica, crystalline silica, fused silica, dolomite, carbon black, calcium carbonate, or said filler, for example Wood flour, PARUBU, a cotton chip, Asbestos, glass fiber, carbon fiber,

enlarged or a lot of bulking agents can be mixed if a plasticizer is used, using it together with a in a hardenability constituent of this invention, since elongation of a hardened material can be

praferrad.

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ohthalate; Dioctyl adipate, \*\*\* aliphatic dibasic acid ester, such as succinic acid isodecyl and dioctyl sebacate; Diethylena giyool dibanzoate, \*\*\*\* glycol ester, such as pentaerythritol ester, Butyl oleate, \*\*\*\* aliphatic series ester species, such as methyl acetyl ricinolste; Tricresyl phosphato, \*\*\*\* ulking agent, it is mora effactive. As an example of a pissticizer, dioctyl phthalste, dibutyl phthalate, •••••• phthalic estor, such as butylbenzyl phthalate, di∸isodecyl phthalsta, and JIISO undecyl phosphoric ester, such as trioctyl phosphate and phosphorio acid octyldiphenyl: Epoxidized soybean oil, \*\*\*\* epoxy placticizers, such as epoxidation linseed oil and epoxy stearic acid benzyl; Polyether, such as a polyester plasticizer, polypropylene glycol which is polyester of dibasic acid and dihydric Polybutadiene, Butadiene Acrylonitrile. polychloroprene, polyisoprene, polybutene, hydrogenation polybutadiene, hydrogenation polyisoprene, Hydrocarbon system oligomer, such as process oil; alcohol, and its derivative; [ Polly alpha-methylstyrene, ] Polystyrene, such as polystyrene. chlorinated paraffins are illustrated. These plasticizers may be used alone and may be used together two or more sorts. A desirable result will be obtained if the amount of plasticizers is used in the range of one to 200 weight section to reactive-silicon-group-containing-organic-polymer 100 weight section.

An apoxy resin can be used together in a hardenability constituent of this invention. In this case, an epoxy resin and reactive silicon group containing organic polymer can be reformed. 0130

such as tetrahydrophtal acid diglycidyl ester and diglycidyl hexahydrophthalate, m-aminophenol series 4s an epoxy resin, can use a publicly known thing widely conventionally, and For example, a biaphanol tycidyl ether of tetrabromobisphenol A. Novolak type epoxy resin, a hydrogenation bisphenol A type spoxy resin, A głycidyl ether type epoxy resin of a bisphenol A propylene oxide addition. Digłycidyl pspoxy resin, a diaminodiphenylmethane system epoxy resin, Urethane modified epoxy resin, various isocyanurate. An epoxidation thing of unsaturation polymers, such as giycidyl ether of polyhydric alcohol, such as polyalkylene giycoi diglycidyl ether and glycerin, a hydantoin type epoxy resin, and oxybenzoic acid, phthalic acid diglycidyl ester. Phthalic acid diglycidyl ester system epoxy resins, A type epoxy reain, Fire retardancy type epoxy resins, such as bisphenol F type cpoxy rosin and cycloaliphatic-epoxy-resin, N, and N-diglycidyl aniline, N,N-diglycidyl o-toluidine, triglycidyl petroleum resin, etc. can be mentioned.

it is desirable from a point of a thing containing at least two epoxy groups having high reactivity when nardening, and a hardened material tending to form the three-dimensional network structure into a bisphenol F type epoxy rasin, novolak type epoxy resin, and a phthalic acid diglycidyl ester system molecula, also in these epoxy resins. As a daairable epoxy resin, a bisphenol A type epoxy resin,

used widely conventionally, For example, triethylenctetramine, tetraethylenepentamine, diethylamino As a hardening agent of an epoxy resin, a publicly known hardening agent for epoxy resina can be propylamine, N-aminoethyl piperazine, m-xylylene diamine, m-phenylenediamine,

aboxy reain can be illustrated from availability and an adhesive point.

carboxylic acid, such as tetrahydro phthalic anhydride and methylene tetrahydro phthalic anhydride, a DODESHINIRU succinic anhydride, pyromelitic dianhydride, and anhydrous KUROREN acid, alcohols, Diaminodiphenylmethane, diaminodiphenyl sulfone, isophoronediamine, Amines, such as 2,4,6-tris Insidious hardening agents, such as enamines, imidazole derivatives, and dicyandiamides. Boron (dimethyl aminomethyl) phonol, Tertiary amine salts, polyamide resin, ketimines, and aldimine. trifluoride comptex compounds, phthalic anhydride, hexahydro phthalic anhydride, Anhydrous phenols, and carboxylic acid can be mentioned. An epoxy resin receives reactive-silicon-group-containing-organic-polymer 100 weight section, It is preferred to use it in the range of one to 100 weight section and also ten to 50 weight section, and it is preferred to bland a hardoning agent of an cpoxy ream per cpoxy resin 100 weight section in the ranga of one to 200 weight section and also ten to 100 weight section.

An ingrediant which limitation in particular does not have in tha mathod of preparation of a

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disablyed using a little suitable solvents, and a usual method of mixing may be adopted. A 1 liquid type, two-component type, or many liquid type compound can also be built and used by combining under ordinary temperature or heating using a mixer, a roll, a kneadar, etc., or an ingredient is these ingredients suitably.

moisture, it will form network structure in three dimensions, and will harden it to a solid which has If a hardenability constituent of this invention is exposed into the atmosphere, by operation of rubber-like elesticity. n a hardenability constituent of this invention, various additive agents can be added if needed. Other renerate, such as a physical-properties regulator and a silane coupling agent, An antioxidant, radical curing catalysts as an example of said additive for example (for example, tetravalent tin, divalent tin, nhibitor, an ultraviolet ray absorbent, a metal deectivator, anti-ozonant light stabilizer, the Lynn system peroxide decomposition agent, lubricant, peints, a foaming agent, a photo-setting resin, a sto.), Adhesive grant agents which adjust the tractive charecteristics of a hardened material to

An example of such an additive is indicated in each gazette of JP.4-69699.B., JP.7-109928.B., JP.69-2784149A, and JP.64-22304.A, for example.

thixotropic grant agent, etc. are raised.

vator resisting property, and electric insulation resulting from a principal chain skeleton and it has Since a hardenability constituent of this invention has outstanding weatherability, heat resistance,

sealing agent, pre-insulation an electric wire, material for cables, a binder, adhesives, a paint, infusion. conveniently for electrical insulation materials, such as electric electronic component materials, such s coating materiel, a sealing agent for rust prevention / water proof, etc. It is useful especially when as a structural elastic sceling compound, a sealing material for multiple glass, a solar cell rear-face high intensity and a physical-properties improvement effect of high elongation, it can use used for adhesives, a structural elastic sealing compound, or a scaling material for siding.

Example

Although working example and a comparative example explain this invention concretely below, this nvention is not limited to this. 0140

(Working example 1-4, comparative example 1)

veight section, Hindered emine light stabiliser (Senkyo Co., Ltd. make, trede name SANORU LS-770) 1010) I weight section, and weter 5 weight section were measured respectively, and it often kneaded (A) As opposed to isobutylene system polymar (Kancka Corp. meke, trade name EP505S:leobutylene sarbonate (product [ mede from Shiroishi Celcium ], trade name SOFUTON 3200) 40 weight section. 3enzotriazol system ultraviolet ray ebsorbent (Giba-Geigy Japan meke, trade neme tinuvin 327) 1 weight section, hindered phenolic antioxidant (Ciba-Geigy Japan make, trade name IRUGA NOx silicon group as an ingredient, Epoxy resin (product [ made from Oil recovery Shell Epoxy ], trade parbonate (Maruo Calcium Co., Ltd. make, trade name MO-5) 50 weight section, Heavy-calciumsystem polymer / paraffin series process oil = 100/50) 150 weight section which has a reactive Maruo Calcium Co., Ltd. meke, trade name SHIRETTSU 200) 50 weight section, Colloid calcium name Epicoat 828) 5 weight section, Hydrogenation alpha-olefin oligomer (product [ made from demitau Petrochemistry ], trade name PAO5004) 60 weight section. Colloid calcium carbonate Photo-setting resin (Toagosei make, trade name ARONIKKUSU M-309) 3 weight section. with a 3 paint roll, and was considered as base resin.

next — as the (B) ingredient — octylic scid (2-cthylhexanoic scid) celoium salt (the Nihon Kegaku Sangyo Co., Ltd. make.) The trade name NIKKAOKU Chicks Ca 5% toluane solution was used as e hardening agent [ in / for the thing for which deteavol amine (the Kao Corp. make, Firmin D80) is respectively shown in Table 1 is a (C) ingredient and wink outdoit number, (owight sections / measure, cold use the apstrill, and was affred and mixed / working avample 1 i. 0142

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JP,2008-150627,A [DETAILED DESCRIPTION]

 octylio acid (2-ethylhexanoic acid) iron (the Nihon Kagaku Sangyo Co., Ltd. make.) The number[ of weight sections ]-used thing which shows respectively lauryl amine (made by Wako Pure Chemical used thing which shows lauryl amine in Table 1 respectively as (B) octylic acid (2-ethylhexanoic acid) ngredient — distearyl amine (the Kao Corp. make.) The number[ of weight sections ]-used thing which shows Firmin D86 in Table 1 respectively is made into working example 2, (B) as an ingredient urthermore shows respectively lauryl amine (mede by Wako Pure Chemical Industries. Ltd.) in Table i as a (B) ingredient as octylic acid (2-ethylhexanoic ecid) titanium (3% tolucne solution) and a (C) ngredient was made into working example 4. On the other hand, the number[ of weight sections ]tin (Japanese east transformation Make, trade name neo SUTAN U-28) and a (O) ingredient was ndustries. Ltd.) in Teble 1 as a trade name NIKKAOKU Chicks Fe 6% toluene solution and a (C) Sangyo Co., Ltd. make.) as a trade name NIKKANAFU textila V 2% toluene solution and the (G) ngredient is made into working example 3, The number[ of weight sections ]-used thing which here — as the (B) ingredient of this invention — naphthenic soid vanadium (the Nihon Kagaku made into the comparative example 1.

filled up. Care-of-health conditions were made into 23 \*\*x7 +50 \*\*x seven days. [per day ] The used before being filled up with the compound, the primor (the Toray Industries Dow Corning make, trade These base resin and hardening agents were mixed by the ratio shown in Table 1, respectively, and aluminum uses the alumite treatment aluminum of the 50x50x5-mm size based on JIS H4000 as a method of the tensile adheaive property specimen to which this is specified JIS A5758-1992 was substrate, After purifying by methyl ethyl ketone (made by Wako Pure Chemical Industries, Ltd.) what constructed the aluminum base material to H type in accordance with the menufacturing name D-2) was dried and used under ordinary temperature for spreading and 30 minutes.

in accordance with the tensile cement test method of 5758 - 1992 N of JIS A, the examination was presented with H type sample obtained by the above-mentioned method on condition of speed-oftesting 50 mm/min among 23 \*\* and the thermostatic chamber of 50\*\*5% of humidity.

hot air drying equipment for one day, it released from compression and was neglected under the room The recovery was measured by the following methods. First, after making H type sample which ended the above-mentioned care of health immersed into 50 \*\* warm water for one day and taking it out, it temperature on the 1st. The thickness of the sample in this case was measured and the recovery to fixed to 70% so that sample thickness might be set to 12 to 8.4 mm, and heating a sample in 100 \*\* was neglected under the room temperature on the 1st. Subsequently, after having compressed and a compressed part was computed.

conditions of 50% of relative humidity was measured. The one where leather-covered time is shorter Time (leather-covered time) until it fills the same compound in an ointment can simultaneously as a measure which estimates hardenability and stretches a hide on the surface under 23 \*\* and the shows that hardenebility is high.

showing the fracture state in front is a fracture state which can be searched for as a sealing material. A result is shown in Table 1. The filled hardened material is thet cohesive failure is shown, and CF

[Table 1]

1				*##	* 18.67	3000	対象を	1
	(A) EC.	Erbuss	200		ĺ	2		
		PA05004	ă			8		
H		7-17-700	à			2		
		7717.3200	à			\$		
		S-08	è			8		
		27 J. 1828	ŧ			φ		
		7227-028-909	è			ey		
		714 1-921010	ł			-		
萩		FEF 7827	Lê			-		
2		4	H					
			ì			- 10		
1	(3) 成分	4996 BCB	ě	6.7				
d	_	17474V	i		9.0			
		40F5RBPe	ě			0.6		
4		124774FT1	i				4.5	
1		20-14-45 Sp	ŧ					3.0
荻	(C) 底分	V ZIMBEL	hid	0.74	0.74			
		3000737	phr			8	92.0	0.66
П	理化体	過報の発売	聖我	+	+	×	2	1.
*	学機能と設工	MSO	Š	6.05	0.07	80.08	3,68	6
		社会会会	MPs	0.45	9.64	0.27	25.0	0.26
#		52年最後	ж	270	769	440	280	340
		影響状態		30	3	33	83	3
		神の見	è		,	60	96	73

working example 3) where used octylic soid iron as a (B) ingredient, and lauryl amine is used as a cowas lower than the comparative example 1, all had stability. High stability was shown when especially elongation after fracture to the comparative example 1 which used octylic acid tin and lauryl amine. About stability, although the recovery at the time of using octylic acid titanium and octylic acid from patalyst, although it had been 9 hours or more leather-covered time, one day afterward, it checked When distearyl amine and lauryl amine were used together for ootylio acid calcium, naphthenio acid covered time about equivalent has been secured as compared with the case where octylic acid tin Jsing an isobutylene system polymer as an ingredient (A) as shown in Table 1 as a (B) ingrediant, and lauryl amine of the comparative example 1 are used together. On the other hand, in the case aving hardened enough. The hardened material which was obtained also in the gap to use such carboxylic acid metal salt for (working example 1-4) showed breaking strength with high all, and ranadium, and octylic acid titanium as a co-catalyst (working example 1, 2, and 4), the leathernaphthenio acid vanadium was used (working example 2).

(Working example 5, comparativa example 2)

and it kneaded once with 3 paint roll, and also checked that dried by decompression stirring at 120 \*\*\* weight section and a dripping inhibitor (made in Kusumoto Chemicals.) The amount part of trade name CCR120 weight section and titanium oxide (Ishihara Sangyo Kaisha, Ltd. mske, trade name TIPAQUE cooling a mixture, it added and stirring mixing of the amount part of dehydrator (Nippon Unicar make, C) The number of waight sactions which shows lauryl amina (made by Wako Pure Chem) which is an out for 15 minutes. The octylic gold zirconium (the Nihon Kagaku Sangyo Co., Ltd. make, trade name NSUPARON #6500 duplexs, benzotriazol system ultraviolet ray absorbent (Ciba-Geigy Japan make, rade name tinuvin 327) 1 weight section, and hindered amine light stabiliser (Sankyo Co., Ltd. make, trade name A-171) duplexs was carried out for 15 minutes. Next, it added and stirring mixing of the rade name SANORU LS-770) 1 weight section were measured, and it mixed in \*\*\*\*\*\*\*. the colloid stirring at 120 \*\* with 5L planetary mixer beforehand for 2 hours it mixed to trade name Hakuenka 3-820) 20 weight section, and stirring mixing was carried out for 10 minutes. Took out the mixture. aminositane coupling agent (Nippon Unicar make, trade name A-1120) 3 weight section was carried NIKKAOKU Chicks Zr.12% toluene solution) which is the (B) ingradient adjusted furthar beforahand, (A) As a polyether system polymer which has reactant allicon as an ingradiant, As opposed to MS polymer \$203 (made by Kaneka Corp.) 95 weight soction, plasticizar (trada name PPG-3000) 55 salcium carbonate (the product made from Shiraishi Industry.) which dried this by decompression or 2 hours, and water content decreased to about 700 ppm with 5L planetary mixer again. After

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gradient in Table 2, and the mixed thing were added, and decomprassion stirring mixing was

## JP,2008-150627,A [DETAILED DESCRIPTION]

nixture might not involve in a bubble, and 1 liquid mold-curing nature constituent was obtained. What parformed for 5 minutes. The cartridge made of paper (product made from the Showa round oylinder) by which the coat was carried out was filled up with the aluminum for 1 liquid so that the obtained sed the amount part of dibutyltin diacetyl acetonate (Japanese east transformation Make, trade names U-220) duplexs was made into the comparative example 2 instead of the mixture of said actylio aoid zirconium and lauryl amina.

nealth conditions were made into 23 \*\*\*x14 +50 \*\*x 14 days. [ per day ] Using the alumite treatment aluminum of the 50x50x5-mm size based on JIS H4000, before the aluminum used as a substrate was condition of for 23 \*\*, and humidity 50 inside of \*\*5% of thermostatic chambar and speed-of-testing method of the tensile adhesive property specimen specified to JIS A5758-1992 using the cancer of industries, Ltd.). In accordance with the tensile cement test method of 5758 - 1992 N of JIS A, the 100% 50%, respectively, and set TB and elongation at the time of a fracture to EB for the stress at marketing of 1 liquid mold-curing nature constituent from 1 liquid cartridge was filled up. Care-offilled up with the compound, it was purified by methyl ethyl ketone (made by Wako Pure Chemical of 50 mm ]/. The hardened material set stress when it alongated 150% to M50, M100, and M150 comperature for 24 hours or more, the specimen used for a tensile test was produced as follows. What constructed the aluminum base material to H type in accordance with the manufacturing examination was presented with H type sample obtained by the above-mentioned method on After neglecting the above-mentioned 1 liquid mold-curing nature constituent under a room

with a 1 cm [in width ] x length of about 3 cm, and it was recuperated for 23 \*\*\*x14 +50 \*\* x 14 days per day. The manual friction text was done after oare of heelth, cutting an adhesion side deneby with cutter britis, and the surface of the absortance was observed. The filled hardened material lei that observed make is shown, and of F in Table 2 is a fracture state searched for as a scaling material. Since an adhesive property tumed into the important characteristic as a 1 liquid mold-curing nature constituent, the adhesive property was checked using anodized aluminium and a vinyl chloride steel nature constituent was placed from 1 liquid cartridge using commercial cancer to the crest shape plate. On each substrate which purified the surface by methyl ethyl ketone, 1 liquid mold-curing

Depths hardenability took out the portion which has hardened the surface which filled in the 80-mmong polyethylene tube 1 liquid mold-ouring nature constituent produced in working example 5, and was made at the tip of a tube in it at 16.5 mm in inside diameter on tha day which the days to measure visited, and measured the hardened thickness with slide calipers.

cartridge is filled up with a constituent, it storad for two weeks in the hot air drying equipment which in order to check the practicality as a 1 liquid mold-curing nature constituent, where 1 liquid carried out the temperature control to 50 \*\*, and the depths hardenability after storage was investigated. A result is shown in Table 2.

	44	B.0.6	9級機器	216004	
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251装御袋物館		MEO	0.27	0.19	6
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	_	MTSO	0,48	0 40	MP.
	TBC	(現代を開発を持つ	0.84	0.93	MP.
	200	EB(GREHUS)	620	570	*
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tott.	東参議化権	23 O×12 M	7.7	10.6	mm
		23 C×2 III	12.2	15, 6	mm
第2次性	原物硬化性	23.C×1期間	7.2	10.8	mm
SOCK SAMESTER		23 C x 2 M M	12.0	16.4	eu.

As opposed to the polyather aystem polymer which serves as the (A) ingredient of this invention in working example 5, (B) By using the lauryl amine which acts the carboxylic acid zirconium salt which acts as a co-catalyst as a (O) ingredient further as a silanol condensation catalyst as an ingredient, dibutylitin discetyl acetorate as a tetravalent tin catalyst, almost comparable elongsticm and an adhesive property were revealed and it checked that I liquid mold-curing nature constituent which may be sufficient for practical use was obtained (Table 2). Although hardenability was slightly inferior as compared with the comparative example 2 using

### Synthetic example 1)

Jse polyoxypropylene triol of the molecular weight 3,000 [ about ] as an initiator, and propylene oxide

is polymerized in a zire hear eystroodalattie glyme complex compound catalyst. Vurthert average molecular weight factor 15,000 (hopsyvare readend molecular weight which the column measured the solvent using THF using the 1050H TSC-GEL Hype using 1050H HC-8120GPO as a finalequivalent was added 1.2 times to the hydroxyl group of this hydroxyl group end polypropylene oxide, polypropylene oxide of the numbar everage molecular weight 28,000 [ about ] which is an allyl group. and methanol was distilled off, and also the allyl chloride was added, and the hydroxyl group of the and was changed into the allyl group. By the above, the end obtained 3 organic-functions sending system) polypropylene oxide was obtained. Then, the methanol solution of NaOMe of the

introduction rate was measured by the following methods by <sup>1</sup>H-NMR (it measures in a CDCI<sub>2</sub> solvent azeotropically at 90 \*\* and distilling off hexane under decempression. On the other hand, after adding conversion) I, 7.0 g of dimethoxymethylslane was dropped. After making the mixed solution react at 30micro of platinum divinyl disiloxane complex (it is 3% of the weight of xylene solution by platinum 80 \*\* for 2 hours, unreacted dimethoxymethylsilane was distilled off under decompression and the polypropylene oxide and 10 g of hexane which were obtained above to 1L autoclave, dehydrating reactive silicon group content polyoxyalkylene series polymer (A-1) was obtained. The number The nitrogen purge was carried out, after having added 500 g of allyl end 3 organic-functions average molecular weight of the obtained polymer (A-1) was about 26,000. The silyl group

Receive the peak integral value of CH<sub>3</sub> group (near 1.2 ppm) of the polypropylene oxide main chain value of the peak integral value of an allyl end proton (near CH2=CH-CH2-:5.1 ppm) : <1>. Receive of said allyl end 3 organic-functions polypropylene oxide before a hydrosilylation reaction. Relativa using JEOL JNM-LA400).

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the peak integral value of OH<sub>3</sub> group (near 1.2 ppm) of the polypropylone oxide main chain of the silyl

JP,2008~150627,A [DETAILED DESCRIPTION]

and polypropylene oxide (A–1) after a hydrosilylation reaction. Relative-value: <2> of the peak integral value of the proton (near CH<sub>3</sub>(CH<sub>3</sub>O) <sub>2</sub>SI-CH<sub>2</sub>-CH<sub>2</sub>-:0.6 ppm) of the methylene group combined with the silicon atom of the end silyl group to the silyl group introduction rate (<2>/<1>) was 78%.

After attaching a three-way cock to the resisting pressure glass container of 2L and carrying out the nitrogen purge of the inside of a container to it, Using an injector, in a container 262.5 ml of (Synthetic example 2)

ethylcyclohexane (thing dry by neglecting 1 or more night with the molecular sieves 3A), and 787.5 ml

of toluene (thing dry by neglecting 1 or more night with the molecular sieves 3A), p-DCC (the following compound (A)) 4.85g (21,0mmol) was added.

3 Formula 10]

was made decompression using the vacuum pump. After opening the needle valve and introducing an group was performed to molecular chain terminals. After adding allyl trimethylsilane and 200 ml of water washed [ 120 minutes ] the reaction solution 4 times, the allyl end isobutylene system polymer Next, the resisting pressure glass liquefied gas extraction pipe with a needle valve containing 438 ml (5.15 mol) of isobutylene monomers was connected to the three-way cock, and after attaching the isobutylene monomer in a polymerization vessel from a liquafied gas extraction pipe, the inside of a start, 7.20 g (63.0mmol) of ally! trimethylsilane was added, and the introduction reaction of the ally! polymerization vassal all over dry ice / ethanol bus of -70 \*\* and cooling, the inside of a container container was returned to ordinary pressure by introducing nitrogen from one side in a three-way cock. Next, 0.72 g (7.7mmol) of 2-methylpyridine was added. Next, 10.58 ml (96.5mmol) of titanium tetrachloride was added, and the polymerization was started. 70 minutes after the polymerization was obtained by distilling off a solvent.

equivalent was added [ methy] dimathoxylilane ] for 24 En and a platinum (why) siloxanol complex to the allif group of m end to the silving roup of m had, and the lyterally information was performed. FT-IR (Silvindazia IR-del) performed restition pursuit, and the absorption issued on the older of 1900. Subsequently, the allyl end isobutylene system polymer 200g obtained in this way, the paraffin-base process oil (the Idenitsu Kosan make.) which is a hydrocarbon system plasticizer After mixing trade name Diana process PS-32 100g and carrying out temperature up to about 75 \*\*, the 7.5x10<sup>-5</sup> om" disappeared in about 20 hours.

In this way, if the obtained polymer is measured by the GPC method (it was considered as the liquid-Module1 made from Waters). The number average molecular weight was 17,600 and Mw/Mn (ratio of 2/1 of PS-32 which is the isobutylene system polymer and plasticizer which have a reactive silicon group in the both ends of the target chain of the mixtures (A-2) of the weight ratio were obtained. [0166] weight avorage molecular weight to a number average molecular weight) was 1.23. <sup>1</sup>H-NMR (using sending system and, as for the solvent, the column used CHCl,, using Shodex K-804 using LC

0165

Varian Gemini300) The proton which belongs to each structure by measurement in CDCI<sub>3</sub> (the proton of initiator origin: 6.5–7.5 ppm) The methyl proton combined with the silicon atom of polymer-terminal origin: As a result of measuring and measuring the intensity of 0.0-0.1 ppm and the resonance signal of methoxy protons.3.4 – 3.5, the end silyl functional group number Fn (number of the silyl group per of methoxy protons.3.4 – 3.5, the end silyl functional group number Fn (number of the silyl group per one molecula of isobutylene polymer) was 1.76.

(A) As an ingredient, various additive agents were measured, respectively, and it often kneaded with a (Working example 6-15, comparative exampla 3)

http://www4.ipdl.inpit.go.jp/ogi-bin/tran\_web\_ogi\_ejje?atw\_u=http%3A%2F%2Fwww4.ipdl.i.. 2010/05/08

polyoxyalkylene series polymer (A-1) obtained in the synthetic example 1, end was considered as 3 paint roll according to the formula shown in Table 2, using the reactive silicon group content

base resin

(C) ingredient, the spatula was used for it, and it stirred and mixed for 3 minutes. It was made for all Next, as a (B) ingredient which is a silenol condensation catalyst. Isuryl smine was further measured for the various carboxylle acid metal salt shown in Table 1 to the above-mentioned base resin as a

the numbers of mals of the metal atom containing the number of addition parts of the various carboxylic acid metal salt of the (B) ingredient to become the same here. 0169

The moid about 3 mm thick was used and filled up with the spatula after mixing, and care of health on 23 \*\*x3 +50 \*\*x, the 4th was performed. [ por day ] From the obtained hardened material sheet, the No. 3 type dumbbell specimen specified to JIS K 6301 was pierced, and the tensile test was carried out in the autograph (tension speed 200 mm/min). The modulus (M50) in the time of being extended 50%, the intensity at the time of a dumbbell fracture (Tb), and the elongation at the time of a

The combination presentation of base resin, a curing catalyst, etc. and the physical-properties eveluation result of the hardenad material obtained from it are shown in Table 3.

dumbbell fracture (Eb) were measured.

Table 3

			_	Į		_	2	-		-	×	¥	-
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	93	6)		4	9	2	3	9			8	2	ž



comparative exampla 3 using 2-ethylhexanoic acid tin as a silanoi condensation cetalyst as shown in able 3, the value of Tb (breaking strength) and Eb (elongation efter fracture) of hardened material When the various carboxylic acid metal salt of working example 6-15 is used compared with the ohysical properties is larger. nttp://www4.ipdl.inpit.go.jp/cgi-bin/tran\_wcb\_ogi\_ejje?stw\_u=http%3A%2F%2Fwww4.ipdl.i.. 2010/05/06

High alongation and high intensity were shown.

ingredient the reactive sillicon group obtained in the synthetic example 2, various additive agents were measured, respectively, and it often kneaded with a 3 paint roll according to the formula shown in A) Using the mixture (A-2) of the isobutylene system polymer and plasticizer which have as an (Working example 18-28, comparative example 4) Table 4, and was considered as base resin.

comparative example 4 for it, and it stirred and mixed for 3 minutes to it. It was recuperated at 23 \*\* condensation catalyst was measured, and also as a (C) ingredient, lauryl amine was used together to after mixing, and the surface hardened state was evaluated five days afterward. It was made for all Next, the various carboxylic acid metal salt shown in Table 4 as a (B) ingredient which is a silanol the numbers of mols of the metal atom containing the number of addition parts of the various the above-mentioned base resin, the spatula was used by working example 16-28 and the carboxvlic acid metal salt of the (B) ingredient to become the same here.

resin, a curing catalyst, etc. is shown in Table 4. What the surface had hardened O in front for five The evaluation result of the hardened state five days after the combination presentation of base days afterward to shown, and it is shown that x had not hardened five days after.

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Constituent using the trimethoxysilyl group as a reactive silicon group)

constituent is shorter than working example 6-15. Therefore, a catalyst amount can be lessened, if he same hardenability constituent as working example 6-15 can be prepared using the polymer ndicated for the example 1-4 of manufacture of JP,2001-72855.A. The tack free time of this cure time is made into the same grade and the polymer which has the above-mentioned

material are freely controllable. For example, the hardenability constituent of working example 6-15 can be prepared using the polymer which mixed the polymer which has a trimethoxysilyl group, and dimethoxy alfyl group is used as a polymer, cure time and the physical properties of a hardened the polymor which has a mathyl dimathoxy silyl group by the waight ratio of 1:10-10:1.

0181

polyoxypropylene (A-3) by which the trimethoxysllyl group was introduced into about 80% of ends was number average molecular weight 17,000 and the polyoxypropylene diol 1000g of molecular-weight distribution Mw/Mn=1.20 as 19g of gamma-isocyanate propyltrimethoxysilane (Nippon Unicar make transformation [ Japanese east ]) is added, it reacted at 90 \*\* until the isocyanate group was no longer detected in IR under the nitrogen air current in this, and the reactive silicon group content compound catalyst. It polymerizes. The obtained polypropylene oxide, Use and to the compound The inside of bottom of N<sub>2</sub> atmosphere 1L autoclaye, According to a composite metal complex Y-5187), and a catalyst. 0.05 g of dibuty! tin sorew isooctylthinglycolate (made in [ U-360 ]

0184

ingredients according to the formula shown in Table 5 using the polyoxyalkylene series polymer (A-3) which has the trimethoxysilyl group obtained in the synthetic example 3, (C) Lauryl amine which is an ingredient was measured, respectively, the spatula was used, and it stirred and mixed for 30 seconds. It was made for all the numbers of mols of the metal atom containing the number of addition parts of surface was lightly pressed down with the spatula after mixing and time (leather-covered time) until a constituent stops adhering at the tip of a spatula was measured. An evaluation result is shown in (A) The polyoxyalkylene series polymer (A-1) which has as an ingradient the methyl dimethoxy allyl the various carboxylic acid metal salt of the (B) ingredient to become almost the same here. The group obtained in the synthetic example 1, The various osrboxylic soid metal salt which is the (B) (Working example 29-32)

[Table 5]

spite of having used the silanol condensation catalyst of the non-tin series, the surface has hardened When the various carboxylic acid metal salt of working example 16-28 is used as shown in Table 4, in

On the other hand, when the carboxylic acid zinc of the comparative example 4 was used.

nardenability had not hardened five days after bad.

0178

Practical hardenability was shown. n five days. 0177

propertias are also fitness (high elongation and high intensity)

For example, the same hardenability constituent as working example 8-15 can be prepared using the arminals as a reactive silicon group, a cure rate will bacome large from the polymer of the synthetic polymer indicated for the example 1 of manufacture of JP,H11-12480.A. The tack free time of this nethyl dimethoxy silyl group. Such a polymer is indicated to JP.H11-12480,A or JP.2001-72855.A. f a trimethoxysilyl group uses the polyoxyalkylene aeries polymer which exists in molecular chain example 1. The direction of a trimethoxysilyl group of this is because reactivity is larger than a constituent is shorter than working example 6-15.

trimethoxysilyl group will be used 0180]

if the mixture of the polymer which has a trimethoxysilyl group, and the polymer which has a methyl

0182

Working example when the polymer which has a trimethoxysilyl group is used is shown below.

(Synthetic example 3) 0183

obtained.

Table 5.

carboxylic acid ziroonium, and a hardenability [ \*\* and others ] constituent, In spite of being a non-tin http://www4.ipdl.inpit.go.jp/ogi-bin/tran\_web\_ogi.ejje?atw\_u=http%3A%2F%2Fwww4.ipdl... 2010/05/06

molecule, (B) Carboxylic acid caloium, carboxylic acid vanadium, carboxylic acid iron, Carboxylic acid tranium, carboxylic acid potassium, carboxylic acid barium, Carboxylic acid manganese, carboxylic 4s mentioned above, the organic polymer which has at least one reactive silicon group in the (A) acid nickel, carboxylic scid cobalt, one or more sorts of carboxylic acid metal salt chosen from a veries catalyst, practical hardenability is ahown, and it turns out that hardaned material physical http://www4.ipdl.inpit.go.jp/cgi-bin/tran\_web\_cgi\_ejje?atw\_u=http%3A%2F%2Fwww4.ipdl.i... 2010/05/06

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As shown in Table 5, the polyoxyalkylene series polymer (A-3; working example 30 and 32) which has a trimethoxysily group had the cure rate quicker than the polyoxyalkylene series polymer (A-1: working example 29 and 31) which has a methyl dimethoxy silyl group.

The same hardenability constituent as working exemple 6–15 can be propared using the proving layers earlies and polymer (4–5) which has the threatheoxylely group obtained in the synthetic exemple 3. This book free time of this constituent has short cure time, and good physical properties 0187

Constituent which used the epoxy resin together) are acquired.

mechanical physical property which has high intensity and high elongation as comparad with the oase where the carboxylic sold tin currently used conventionally is used as a curing catalyst. Therefore, the hardenability constituent of this invention is very useful as various elastomers, such as a sealing The same hardenability constituent as working assumple B-15 can be propared using the constituent which used together eastly estimate groups objecting together otherwising together objective and an epoxy resin. When this constituent is used, the manifestation of athesive strongful is quick. bond (B) Carboxylle aoid edictum, carboxylle acid venselium, carboxylle acid iron. Carboxylle acid tutum, carboxylle acid external the hardenships of constituent contraining tutumium. The hardenships oversity constrained contraining one or more acrts of carboxylle acid metal asile which it comes to choose out of carboxylle acid one or more acrts of carboxylle acid metal asile which it comes to choose out of carboxylle acid mengeness, carboxylle acid inclikely, carboxylle acid cobalt, and a carboxylle acid zirconium. While atom, and has at least one silicon content group which can construct a bridge by forming a siloxane revealing practical hardenability and stability, the hardened material obtained shows the outstanding A) The organic polymer which has the hydroxyl group or hydrolytic basis combined with the silicon material, adhesives, a binder. [Industrial applicability] 0189

Translation done.]